

NAVAL PROGRAMMES

GORDON I. PETERSON'

THE MULTI-MISSION NATIONAL SECURITY CUTTER

EXCLUSIVE SPECIAL REPORT



Fig. 1: First-of-class National Security Cutter "Bertholf" in her element after launching on September 28th, 2006 – already proudly bearing her bright white hull paint and Coast Guard markings.
(Photo: Courtesy Northrop Grumman / Ron M. Elias)

At 418-feet, the "Legend" class National Security Cutter (NSC) is designed to be the flagship of the U.S. Coast Guard's fleet, capable of executing the most challenging maritime security missions and being supportive of a shared Coast Guard – Navy commitment to the mission requirements of the joint U.S. combatant commanders. The NSC is the largest and most technically advanced class of the Integrated DEEPWATER System (IDS) programme's three major classes of cutters.

WHAT IS DIFFERENT IN THE NCS DESIGN

The NSC's design will provide better sea keeping and higher sustained transit speeds, greater endurance and range, and the ability for launch and recovery, in higher sea states, of improved small boats, helicopters, and unmanned aerial vehicles – all key attributes in enabling the Coast Guard to implement increased security responsibilities. Such duties include exerting more effective jurisdiction over foreign-flagged ships transiting U.S. waters. DEEPWATER's more capable maritime security cutters, for example, will enable the Coast Guard to screen and target vessels faster, more safely, and reliably before they arrive in U.S. waters – to include conducting onboard verification through boardings and, if necessary, taking enforcement-control actions.

Coast Guard officials say that the National Security Cutter:

"The Centerpiece of the U.S. Coast Guard's Mission Execution"

in the words of Rear Adm. Gary T. Blore, the IDS programme executive officer (PME), will serve as an integral part of the Coast Guard's collaborative inter-agency effort to achieve maritime domain awareness and ensure the safety of the American public and sovereignty of U.S. maritime borders.

The Coast Guard plans to acquire eight of the multi-mission cutters. The first, the "Bertholf" (WMSL 750), will be christened Nov. 11, 2006, at the Northrop Grumman Ship Systems shipyard in Pascagoula, Miss., and be delivered to the Coast Guard in 2007. The keel for the sec-

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THE U.S. COAST GUARD'S NATIONAL SECURITY CUTTER

Technical Specifications and Characteristics

The National Security Cutter will be outfitted with the small boat package and aviation detachment most appropriate for that particular patrol, but it was designed to deploy with a Multi-mission Cutter Helicopter (MCH) and two Vertical Takeoff-and-Landing Unmanned Aerial Vehicles (VUAVs). It has the ability to carry more fuel, personnel, evacuees, and provisions than any of the U.S. Coast Guard's aging legacy surface assets.

Features:

- Automated weapon systems;
- Medium-calibre deck gun (57mm) capable of engaging targets at longer ranges;
- State-of-the-art C4ISR interoperability between Coast Guard, the Department of Homeland Security, and the Department of Defense;
- Detection and defence capabilities against chemical, biological, radiological, nuclear and explosive (CBRNE) attack;
- Advanced sensors for intelligence information collection and sharing; and
- Real-time tracking and seamless Common Operating Picture/Maritime Domain Awareness via integration with RESCUE 21.

Characteristics:

- Number Planned: 8
- Length: 418 ft.
- Displacement: 4,300 LT
- Speed: 28 knots
- Endurance: 60 days
- Range: 12,000 nautical miles
- Propulsion: Combined Diesel and Gas Turbine (CODAG - 2 Diesels, 1 Gas Turbine)
- Aircraft: (2) Multi-mission helicopter (MCH, or (4) Vertical Takeoff-and Landing
- Unmanned Aerial Vehicles (VUAVs), or (1) MCH and (2) VUAVs
- Boats: (1) Long-Range Interceptor (LRI) and (1) Short-Range Prosecutor (SRP)
- SLQ-32 Electronic Warfare System
- Armament: 57mm gun and Gunfire Control System, Close-In Weapons System (CIWS), SRBOC/NULKA countermeasures, chaff/rapid decoy launcher

Hull 1: "Bertholf" (WMSL-750)

- Named for Commo. Ellsworth P. Bertholf, a Coast Guard hero and the first commandant of the modern-day Coast Guard.
- Contract awarded to ICGS for production and delivery June 2004
- Keel laid March 29, 2005; sponsor Mrs. Meryl J. Chertoff (wife of Secretary of Homeland Security Michael Chertoff)
- Construction approximately 60 percent complete
- Christening scheduled for Nov. 11, 2006
- Delivery to Coast Guard scheduled in 2007

Hull 2: "Waesche" (WMSL-751)

- Named for Adm. Russell Waesche, Coast Guard commandant during World War II
- Contract awarded to ICGS for production and delivery January 2005
- Keel laid Sept. 11, 2006
- Construction approximately 12 percent complete
- Delivery to Coast Guard scheduled in 2008

Fig. 2: Northrop Grumman Ship Systems has rebounded from the devastation inflicted at its shipyard in Pascagoula, Miss., a year ago by Hurricane KATRINA thanks in large part to workers like Daniel L. Wilson, a boat foreman for the yard's construction of U.S. Coast Guard National Security Cutters. The massive hurricane left five feet of water in his home and three trees on its roof. Wilson spent the next seven months both working at the shipyard and personally rebuilding his home. With his wife and three children, he reoccupied his residence in April. In forwarding his picture the author wrote: "All too often the brass get the coverage ... and we sometimes forget that it is men and women like Mr Wilson who make all things possible" – the editor couldn't agree more! (Photo: Courtesy U.S. Coast Guard / Gordon I Peterson)

ond, the "Waesche" (WMSL 751), was laid in Pascagoula Sept. 11, 2006, and is scheduled for delivery in 2008. **Integrated Coast Guard Systems** (ICGS, a joint venture between **Northrop Grumman** and **Lockheed Martin** serving as the IDS systems integrator) was awarded the contracts for ship design and construction. [For ship specifications and origin of names see sidebar below.]

Northrop Grumman Ship Systems is leading the production effort. Lockheed Martin also plays an important role with its work focused primarily on the cutter's systems for C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance).

EVOLVING MISSION REQUIREMENTS

Just as the multiple maritime and military roles of the U.S. Coast Guard have grown in scope and significance since the 9/11 terrorist attacks against the United States, so too have the NSC's capability requirements evolved to be responsive to today's ever-more challenging operational missions and threats.

"The Coast Guard's DEEPWATER Programme existed prior to 9/11", said Blore at the keel-laying ceremony for "Waesche", "as did our Coast Guard, as did this shipyard. For DEEPWATER to modernise and recapitalise the Coast Guard, we need to change with the threat."



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Assessments of the impact that the events of 9/11 and the emerging terrorist threat would have on Coast Guard missions quickly began to influence the pre-9/11 mission requirements documented in the Coast Guard's detailed *IDS Mission Need Statement* issued in 2004. "To effectively push the borders outward", the document states, "the service needs more capable assets with new technology for better surveillance, secure communications, and more efficient command and control – and that is what the IDS is designed to provide."

A decision was soon made to enlarge the cutter's flight deck to approximately 4,000 square feet to allow tail-wheel equipped helicopters of the U.S. Navy, U.S. Army, and U.S. Customs and Border Protection to launch and recover. In time, the need for additional capability improvements was validated. In 2005, the updated *IDS Mission Need Statement* and revised post-9/11 Implementation Plan were approved by the Department of Homeland Security (DHS) following the Coast Guard's comprehensive, year-long performance-gap analysis of post-9/11 mission requirements.

The Bush administration and the U.S. Congress, presented with the Coast Guard's plan to



Fig. 4: During a ceremony Sept. 11, 2006, marking the fifth anniversary of the 9/11 terrorist attacks, Northrop Grumman welder Willis "Willie" Griffin, a shipyard employee at the company's shipyard in Pascagoula, Miss. since 1968, welds Rear Adm. Gary T. Blore's initials into the keel plate of the Coast Guard cutter "Waesche" to signify its keel is "truly and fairly laid." "Waesche" is the second cutter in the "Legend" class of more capable National Security Cutters being build as part of the Coast Guard's Integrated DEEPWATER System (IDS). Blore serves as the IDS programme executive officer (PEO). (Photo: Courtesy Northrop Grumman / Ron M. Elias)

modify the DEEPWATER Programme to align it with post-9/11 requirements, quickly embraced the revised implementation plan. It provides, in part, for modifications to the original assets that would have been delivered by the DEEPWATER project to incorporate improved post-9/11 capabilities. This decision carried important implications for the National Security Cutter, and its design was adapted to match today's circumstances and emerging threats.

The NSC, for example, will contribute to improved maritime domain awareness (MDA), intelligence collection, and information sharing through a sophisticated Shipboard/Sensitive Compartmentalised Information Facility (S/SCIF), improved sensors, and increased data-exchange bandwidth. The cutter's connectivity with DHS, the Department of Defense (DOD), and local first responders also is enhanced with interoperable radio communications, and it will be fully integrated with the Coast Guard's National Distress Response Modernisation Programme, known as RESCUE 21, which will provide U.S. port commanders with real-time tracking of the NSC and a seamless Common Operating Picture (COP) and MDA-data sharing, including the Automated Identification System (AIS).

The cutter's four gun mounts for small-arms automatic weapons will be remotely operated and fully integrated with the cutter's radar and infrared sensors to provide improved protection for the cutter and high-value assets under its protection. Its Maritime Security Capabilities allow cutter's weapons and command-and-control

suite to be upgraded and hardened to better survive potential terrorist incidents and process increased data flow. This will include the SRBOC/NULKA missile defence system with the Close-in Weapons System (CIWS), the SLQ-32 ESM, and a medium-calibre deck gun (57mm *Bofors* UDLP) that will provide the ability to engage at greater ranges with improved accuracy.

Detection and defence capabilities also are provided against chemical, biological, radiological, nuclear, and explosive (CBRNE) attack to allow the NSC to remain on scene and operate during incidents involving weapons of mass destruction.

The NSC's aviation assets typically will include two multi-mission helicopters (MCH) or, when in-service, four Vertical Takeoff-and Landing Unmanned Aerial Vehicles (VUAVs). Alternatively, embarked aviation assets could be one MCH and two VUAVs. The cutter's stern ramp for small boat launch-and-recovery operations is designed to accommodate both the 35-foot Long Range Interceptor (LRI) and the 25-foot Short Range Prosecutor (SRP), the two new rigid-hull inflatable small boats being developed for the DEEPWATER cutters.

For propulsion, a *Detroit Diesel* combined diesel and gas turbine (CODAG) with one General Electric *GE LM2500* gas turbine rated at 29,500 shp and two *MTU 20V1163* medium-speed diesels rated at 9,730 bhp for a combined 48,960 shp will enable a maximum sustained speed 28 knots (with diesels/gas turbine combined) and a 12,000nm range at eight knots. Other propulsion system components include *RENK* CODAG reduction gear, 38,000kW, type AS 2/250-AS 198F, twin screws with two *Rolls Royce* 14-foot controllable-pitch propellers, and a *Rolls Royce Kamewa* through-hull bow thruster with a controllable-pitch propeller rated at 450 hp.

"This National Security Cutter", said Secretary of Homeland Security Michael Chertoff at



Fig. 3: This shot of the U.S. Coast Guard's National Security Cutter "Bertholf" having its new Mk 110 57mm deck gun lowered into place at Northrop Grumman's shipyard in Pascagoula, Miss., on Sept. 11, 2006 shows the beautiful lines of the cutter. (Photo: Courtesy Northrop Grumman Ship Systems' photographer Ron M. Elias)

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the “Bertholf” keel laying in March 2005, “is a visible symbol of the new generation of equipment that we are going to provide to the men and women of the Coast Guard. Importantly, this cutter is not just a ship, but it is an integrated system, a system that is designed to perform in the defence of this country. In a way, that's emblematic of the DEEPWATER Programme itself, which is not simply a collection of individual assets, cutters, ships and aircraft, but is part of a capability – part of a performance-based effort designed to deliver a result: a successful mission of protecting these United States.”

STRUCTURAL-DESIGN ENHANCEMENTS

Not atypically for a first-in-class ship, during the Coast Guard's review of the NSC's design from 2002 to 2004, concerns were raised about certain aspects of the ship's structure that could prevent it from achieving its required 30-year service life. Specifically, Coast Guard and independent technical experts questioned whether some of the cutter's structural components would experience fatigue damage prior to the service-life objective, a critical consideration given the extended, high-tempo operations expected of the NSC.

After thorough review, the Coast Guard determined earlier this year that it is in the U.S. Government's interest to increase the fatigue tolerance of the NSC to ensure that the ship's basic structures will meet its projected 30-year service life. Engineering changes to address the desired structural enhancements were developed in collaboration with the U.S.

Fig. 5: The U.S. Coast Guard's National Security Cutter “Bertholf” boasts its first distinctive coat of white paint in this view taken Sept. 11, 2006, at Northrop Grumman's shipyard in Pascagoula, Miss.
(Photo: Courtesy U.S. Coast Guard / Gordon I. Peterson)



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Navy and other naval engineering experts for approval by the DEEPWATER Programme's technical authority, the Engineering and Logistics Directorate at U.S. Coast Guard Headquarters in Washington, D.C. To improve the current design, a Statement of Work (SOW) will be forwarded to Integrated Coast Guard Systems for implementation.

DEEPWATER Programme officials say that the NSC structure does not pose an immediate safety concern; rather, it presents a risk that it may need some structural repairs during its service life. The areas of greatest concern include details along the vessels weather deck where bending stresses are greatest and where the structural configuration of topside arrangements are relatively more complex.

A variety of methods are commonly used to enhance the strength of a ship's structure (e.g., treatment of welded joints, material upgrades, increased thickness of plates and structures, revised geometry for components, etc.). Specif-

ic details of the NSC's structural configuration changes needed to implement the design enhancements will be finalised when ICGS reviews the Coast Guard's recommendations, identifies possible alternatives, and develops detailed design drawings of the changes.

Structural enhancements to improve the NSC's fatigue life need not be done immediately, the Coast Guard says. Hulls one and two will have much of the work done at their first yard availability. NSC hulls three through eight will incorporate design changes during construction. Any known or suspected fatigue concerns will be addressed when this design change is incorporated on the NSC. In the end, Coast Guard officials say, the NSC will be designed to achieve a 30-year fatigue life and built to deliver 21st Century capabilities to the Coast Guard in a way that will enhance the safety and well-being of its crew and allow the Coast Guard to execute its central missions more effectively, efficiently, and safely.

HONOURING PATRIOTS

American patriots were honoured in Pascagoula Sept. 11 on the fifth anniversary of the 9/11 terrorist attacks today when officials from Northrop Grumman Corporation and the U.S. Coast Guard laid the keel for the second National Security Cutter, "Waesche" (WMSL 751).

"I don't think we could have chosen a more meaningful day to hold the keel laying for a new National Security Cutter for the Coast Guard", said Northrop Grumman Ship Systems President Philip A. Teel. "Five years ago today, everything in America changed. The Coast Guard also began transforming as a result of

what happened. They transformed into a multi-mission homeland security force. And we and our industry partner, Lockheed Martin, are interested in giving the U.S. Coast Guard the means to support them in both their traditional mission and this new broad security mission. And we do understand the great sense of urgency in that support."

Teel noted that after Hurricane KATRINA hit the shipyard and the Gulf Coast a year ago, Northrop Grumman shipbuilders met the challenge to resume operations as quickly as possible. "The first National Security Cutter, "Bertholf", was the first ship to return to production, just 12 days after the storm", Teel said.

Rear Adm. Blore praised shipyard workers as patriots for their role in building the first two National Security Cutters. "As we all know, September 11 is called Patriot Day", Blore said. "And we celebrate all of those who sustain America's freedom. To the men and women of this shipyard: Your dedication to producing a National Security Cutter on the Coast Guard's behalf and your commitment to excellence are enough for you to be called patriots. But to have regrouped after Hurricane KATRINA – to have rebuilt the shipyard, all while rebuilding your homes – is truly inspiring."

Speaking on behalf of the Coast Guard, Blore thanked shipyard workers for their patriotism and dedication. "And thank you for helping us build the 21st Century Coast Guard", he said. Northrop Grumman welder Willis "Willie" Griffin, a shipyard employee since 1968, then welded Rear Adm. Blore's initials into the keel plate of "Waesche" (see figure 4), signifying its keel is "truly and fairly laid". Griffin said it was "an honor" to participate in the ceremony.

Less than two weeks later on Sept. 22, "Bertholf" started preparation for launch with a carefully orchestrated movement across the surface of the shipyard's West Bay Extension Area using a 'translation system' of electrically powered rail cars riding on the shipyard's track grid (see figure 6). The system allows the yard to move ships large and small in all four geographic directions.

The movement of "Bertholf" movement was completed when she was lowered on a floating drydock adjacent to the Extension Area to complete final inspections and preparations for launch. The cutter's launch commenced during the evening of Sept. 28, and "Bertholf" finally floated free the following day to take to the sea for the first time.

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Gordon I. Peterson, a Senior Technical Director with General Dynamics Information Technology, supports the Integrated DEEPWATER System Programme Executive Office at U.S. Coast Guard Headquarters.

Fig. 6: The U.S. Coast Guard Cutter "Bertholf" (WMSL-750), the first of eight "Legend" class National Security Cutters under construction as part of the DEEPWATER Programme, is moved in a delicate operation (using a "translation system" of electrically powered rail cars riding on the shipyard's track grid) onto a floating dry dock Sept. 22 at the west bank of the shipyard at Northrop Grumman Ship Systems facility in Pascagoula, Miss., in preparation for launch. The cutter's christening is scheduled for Nov. 11, 2006, and the Coast Guard will take delivery from Integrated Coast Guard Systems in 2007. (Photo: Courtesy Northrop Grumman / Ron M. Elias)

